

REMARKS

The Applicants are filing this Amendment and Response in response to an Office Action dated August 14, 2007. At the time of the Office Action, claims 1-26 were pending. In this Response and Amendment, no claims are canceled or added. Accordingly, claims 1-26 remain currently pending. Claim 1 is amended herein. As the case is currently under final rejection, Applicants respectfully request entry of the amendment set forth herein pursuant to 37 C.F.R. § 1.116.

In the Office Action, claims 1-20 and 26 were rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. Claims 1-10, 12-20 and 26 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Further, claims 1, 2, 4, 7-10, 11, 12, 14, 17-19, 20-23, 25 and 26 were rejected under 35 U.S.C. §102(b) as being anticipated by Recio et al., International Publication No. WO 00/72142 A1 (“the Recio reference”). In addition, claims 3, 13 and 24 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Recio reference in view of a publication entitled “Overview of Modern SCSI Networking Protocols” (“the SCSI reference”). Claims 5, 6, 15 and 16 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Recio reference in view of Modi et al., U.S. Publication No. 2004/0190533 (“the Modi reference”). Each of these rejections is addressed in detail below.

Rejection Under 35 U.S.C. § 101

With respect to the Examiner's rejection of claims 1-20 and 26 under §101 as being directed to non-statutory subject matter, the Examiner stated that "the 'apparatus' claimed is in fact software per se and not a process, machine, or composition of matter." *See* Office Action, pp. 2. Applicants respectfully traverse this rejection.

Legal Precedent

According to the Supreme Court, congress intended statutory subject matter to "include anything under the sun that is made by man." *Diamond v. Chakrabarty*, 447 U.S. 303, 308-09; 206 U.S.P.Q. 193, 197 (1980). Indeed, exclusions of statutory subject matter are limited to laws of nature, natural phenomena and abstract ideas. *See Diamond v. Diehr*, 450 U.S. 175, 185; 209 U.S.P.Q. 1, 7 (1981). Other than these specific exceptions, therefore, nearly anything man made is statutorily patentable subject matter under 35 U.S.C. §101.

In determining when process or method claims include statutory subject matter, the Supreme Court in *Diehr* stated that "[t]ransformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines." *See id.* 450 U.S. at 183-185, 209 U.S.P.Q. at 6. In addition to the Supreme Court's transformation and reduction test, the Federal Circuit has developed a second test which may also be used to determine if a claim recites statutory subject matter, namely does the claim produce a "useful, concrete, and tangible result." *In re Alappat*, 31 U.S.P.Q.2d 1545, 1557 (Fed. Cir. 1994) (*en banc*). The Federal Circuit further elaborated on this second test by holding that one must look to "the essential characteristics of the subject

matter, in particular, its practical utility.” *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 47 U.S.P.Q.2d 1596, 1602 (Fed. Cir. 1998).

However, explaining this “useful, concrete, and tangible” test, the Federal Circuit has stated “the dispositive inquiry is whether the claim as a whole is directed to statutory subject matter.” *In re Alappat*, 31 U.S.P.Q.2d at 1557. Indeed, there has been no requirement from Congress, the Supreme Court, or the Federal Circuit mandating that a specific final result be shown for a claim to qualify under Section 101. *See id.* Rather, the Federal Circuit has specifically stated “the *Alappat* inquiry simply requires an examination of the contested claims to see if the claimed subject matter *as a whole* is a disembodied mathematical concept representing nothing more than a ‘law of nature’ or an ‘abstract idea,’ or if the mathematical concept has been reduced to *some practical application rendering it ‘useful’*.” *AT&T Corp. v. Excel Communications, Inc.*, 50 U.S.P.Q.2d 1447, 1451 (Fed. Cir. 1999) (emphasis added). Therefore, if a claim meets either the transformation and reduction test put forth by the Supreme Court, or if the claim, read as a whole and in light of the specification, produces any useful, concrete, and tangible result, the claim meets the statutory requirements of §101. *See id.*

Deficiencies of the Rejection

Applicants respectfully assert that claims 1-20 and 26, taken as a whole, each recite statutory subject matter under 35 U.S.C. §101 because they produce a useful, concrete and tangible result. The present application is directed to a system which utilizes transport protocols for efficiently providing flow control communication between computer systems.

Particularly, the present application is aimed at alleviating problems associated with systems having limited flow control capabilities, whereby:

[t]he protocol may not manage various types of commands because it has a limited flow control. As a result, other protocols assisting the iSCSI protocol in the data transfer, such as a datamover protocol, may be utilized to enforce stricter forms of send message flow control to deterministically manage the flow control within the data exchange.

Application, paragraph 4.

For example, independent claim 1 recites an apparatus for managing flow control of a data transfer comprising a processor. The process is further recited to be capable of operation according to a protocol that “determines whether one of the plurality of receive buffers is available for a data packet and (a) if one of the plurality of receive buffers is available, permits an acknowledgement packet to be sent to a node that sent the data packet, and (b) if one of the plurality of receive buffers is unavailable, *drops the data packet, notifies the second protocol regarding the unavailability of the plurality of receive buffers*, and withholds the acknowledgement packet.” (Emphasis added.) Similarly, independent claim 21 recites a method whereby “if the at least one buffer is unavailable, *dropping the data packet*, providing a notification regarding the unavailability of the at least one buffer, and *withholding an acknowledgement packet from the node* that sent the data packet.” (Emphasis added.) Independent claims 11 and 26 recite similar subject matter.

Independent claims 1, 11, 21 and 26, taken as a whole, recite systems and a method that provide protocol stacks with a flow control mechanism that does not drop connection between nodes, i.e., computer systems, when no receive buffers are available. Further, the

systems and methods recited by the claims provide a flow control mechanism that may be transparent to existing TCP implementations and may not have any adverse effects on the existing networks because the flow control mechanism conforms with the existing standards. This is clearly a useful, concrete and tangible result which addresses the above mentioned shortcomings of systems having limited flow control capabilities. Because independent claims 1, 11, 21 and 26 recite a concrete and tangible result that improves the performance of computer systems, they necessarily recite statutory subject matter under Section 101. Accordingly, Applicants respectfully request withdrawal of the rejection of claims 1-20 and 26 under § 101.

Rejection Under 35 U.S.C. §112, Second Paragraph

With respect to the rejection of claims 1-10, 12-20 and 26 under 35 U.S.C. § 112, second paragraph, the Examiner asserted that claims 1-10, 12-20 and 26 are vague and indefinite because they recite “the limitation of an ‘apparatus’ however the claims lack a physical component.” *See* Office Action, page 2. Applicants respectfully traverse this rejection.

Legal Precedent

Although the Examiner may take exception to the terms used in the claims, the patentee may be his own lexicographer. *Ellipse Corp. v. Ford Motor Co.*, 171 U.S.P.Q. 513 (7th Cir. 1971), *aff’d*, 613 F.2d 775 (7th Cir. 1979), *cert. denied*, 446 U.S. 939 (1980). The Examiner is also reminded not to equate breadth of a claim with indefiniteness. *In re Miller*, 441 F.2d 689, 169 U.S.P.Q. 597 (CCPA 1971).

Further, the Examiner is reminded that

[d]efiniteness of claim language must be analyzed, not in a vacuum, but in light of:

- (A) The content of the particular application disclosure;
- (B) The teachings of the prior art; and
- (C) The claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.

In reviewing a claim for compliance with 35 U.S.C. 112, second paragraph, the examiner must consider the claim as a whole to determine whether the claim apprises one of ordinary skill in the art of its scope and, therefore, serves the notice function required by 35 U.S.C. 112, second paragraph, by providing clear warning to others as to what constitutes infringement of the patent. *See, e.g., Solomon v. Kimberly-Clark Corp.*, 216 F.3d 1372, 1379, 55 USPQ2d 1279, 1283 (Fed. Cir. 2000).

M.P.E.P §2173.02.

Deficiencies of the Rejection

Claims 1-10, 12-20 and 26 recite systems that implement specific protocols as part of a flow control system between nodes. More importantly, such protocols define attributes of certain communication devices enabling those to communicate. For example, as clearly stated in the specification:

In FIG. 2, a process protocol 202, which may comprise a process, an upper layer protocol, or an application, may interact with the protocol stack to communicate with other devices or within the node. The process protocol 202 may interact with a process protocol in another system to exchange data. For instance, the process protocol 202 may comprise an intelligent peripheral I/O interface, such as a small computer systems interface (“SCSI”) protocol, which allows many different peripheral devices to communicate with other

components of the system. The process protocol 202 may interact with an application protocol 204, which may be an Internet SCSI (“iSCSI”) protocol.

Specification, p. 8.

Hence, the Applicants specification teaches that, without the claimed protocols, the above mentioned devices would not operate as disclosed. Accordingly, the claimed protocols are part and parcel of devices, such as those disclosed above, operating according to specific settings, preferences, standards, etc., prescribed by a communication network.

The Applicants further note that claim 1 has been amended to recite a “processor.” Accordingly, claim 1 and the claims dependent thereon clearly recite a physical hardware element to which the characterization as an “apparatus” is entirely appropriate. Claims 12-20 are dependent from claim 11, which is directed to a network that comprises “a plurality of systems.” Again, hardware elements are clearly included. Claims 12-20 are dependent upon claim 11, and accordingly include the hardware limitations set forth therein. Independent claim 26 is written in means-plus-function format intended to invoke 35 U.S.C. § 112, paragraph 6. Under Section 112, paragraph 6, claim limitations are interpreted to encompass hardware elements recited in the specification and equivalents. Accordingly, claim 26 also clearly includes hardware components. Applicants therefore request withdrawal of the rejection of claims 1-10, 12-20 and 26 under Section 112, second paragraph.

For at least these reasons, Applicants contend that term “apparatus,” as recited by the claims, is definite such that it complies with Section 112, second paragraph. Accordingly,

Applicants request the Examiner to withdraw the rejection of claims 1-10 and 26 under 35 U.S.C. §112, second paragraph.

The Rejection Under 35 U.S.C. §102(b)

With respect to the rejection of independent claims 1, 11, 21 and 26 under Section 102(b) based on the Recio reference, the rejection of claim 1 is exemplary. In that rejection, the Examiner stated:

Claim 1

An apparatus for managing flow control of a data transfer, comprising: a first protocol associated with a plurality of receive buffers (Figures 1-5 and Page 8 lines 4-11; multiple storage and memory components); a second protocol adapted to manage the plurality of receive buffers for the first protocol (Figure 1-5 and Page 5 lines 5-12; processors); and a third protocol that determines whether one of the plurality of receive buffers is available for a data packet and (a) if one of the plurality of receive buffers is available, permits an acknowledgement packet to be sent to a node that sent the data to a node that sent the packet, and (b) if one of the plurality of receive buffers is unavailable, drops the data packet, notifies the second protocol regarding the unavailability of the plurality of receive buffers, and withholds the acknowledgement packet (Figures 1-5 Page 12 line 25 Page 13 line 5 & page 14 lines 3-7 & Page 14 lines 3-7 & Page 23 lines 29-31; reliability, acknowledgement, successive retries and time-outs).

Office Action, pp. 3-4.

Legal Precedent

The Applicants respectfully traverse the rejection. Anticipation under section 102 can be found only if a single reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985). For a prior art reference to anticipate under section 102, every element of the claimed invention must be identically

shown in a single reference. *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

In order to maintain a proper rejection under section 102, a single reference must teach each and every element or step of the rejected claim, else the reference falls under section 103.

Atlas Powder v. E.I. du Pont, 750 F.2d 1569 (Fed. Cir. 1984). Accordingly, the Applicants need only point to a single element not found in the cited reference to demonstrate that the cited reference fails to anticipate the claimed subject matter. The prior art reference also must show the *identical* invention “*in as complete detail as contained in the ... claim*” to support a *prima facie* case of anticipation. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q. 2d 1913, 1920 (Fed. Cir. 1989).

Deficiencies of the Rejection

In the present case, the rejection under Section 102 of independent claims 1, 11, 21 and 26 is improper because every element of the claimed invention is not identically shown in the Recio reference. Specifically, independent claims 1 and 11 recite hardware in which “a first protocol [is] associated with a plurality of receive buffers,” and “a second protocol *adapted to manage* the plurality of receive buffers for the first protocol.” (Emphasis added.) Further, independent claim 21 recites a method having conditional steps whereby “if the at least one buffer is unavailable, *dropping the data packet*, providing a *notification* regarding the unavailability of the at least one buffer, and *withholding an acknowledgement* packet from the node that sent the data packet.” (Emphasis added.) Independent claim 26 contains similar recitations.

In contrast to the Applicants' claims, the Recio reference discloses a system utilizing queue pairs (QPs) and work queues (WQEs) for exchanging information between computer systems. In rejecting the claims, the Examiner interpreted Recio's send and receive WQEs and/or QPs as the claimed first protocol stack. *See* Office Action, page 11 and Recio, page 9, lines 29-31. The Examiner further asserted that the claimed second protocol stack adapted to manage the plurality of receive buffers for the first protocol stack is set forth in the following portion of the Recio reference:

A Partition Manager must exist in subnets which are not globally partitioned. An example of a globally partitioned subnet is a singleton system SANIC-adapter LLE pair. The PM generates PKeys and associates identical PKeys with all endnodes within a specific partition. The PM sends the appropriate authentication value and a PKey to be written to tables used by SANICs and LLEs.

The PM must maintain a complete list of IP Address-DLID-PKey values for a given subnet. An IP Address-PKey reference is needed for some recover scenarios where abrupt hot plug/unplug events occur. DLIDs are not necessarily persistent across power cycling and may also be reassigned due to an event that causes autonomous protocol to change DLIDs (e.g., a hot plug event). The IP Address-DLID PKey list, whether distributed or consolidated, must be kept persistent from power on to power on. This ensures that the association of an endnode with its targeted endnodes does not change without explicit direction from an authorized management entity. Preferably, primary and a fail-over list be maintained for high availability.

A human-readable partition list is likely a grouped listing of IP Addresses within a management domain that share a common PKey. This is, however, dependent upon policy of the management providers. PKeys are not directly visible to applications or operating Systems, with the exception of the PM function.

Recio page 36, lines 3-25.

First, Applicants submit that there is no disclosure in the Recio reference suggesting that the cited WQEs and QPs constitute the claimed protocol, e.g., first protocol as defined in the application. Second, assuming *arguendo* that they do, there is no teaching in the above cited portion of the Recio reference that indicates the manner by which Recio's partition manager manages the WQEs and/or QPs, which the Examiner regards as the first protocol. In fact, the WQEs and QPs are not even mentioned in the above portion cited by the Examiner. Accordingly, Applicants submit that the Recio reference does not disclose a second protocol *adapted to manage* the plurality of receive buffers for the first protocol, as recited by independent claim 1 and 11. For this reason alone, the Reich reference fails to anticipate independent claims 1 and 11, as well as the claims dependent thereon.

Further, in rejecting independent claim 21 the Examiner set forth the following portion of the Recio reference:

The reliable connection service of distributed computer system 100 associates a local QP with one and only one remote QP. Thus, QP 116 is connected to QP 122 via a non-sharable resource connection 128 having a non-sharable resource connection 128a from send work queue 116a to receive work queue 122a to receive work queue 116b. QP 118 is connected to QP 124 via a non-sharable resource connection 130 having a non-sharable resource connection 130a from send work queue 118a to receive work queue 124b and a non-sharable resource connection 130b from send work queue 124a to receive work queue 118b. QP 120 is connected to QP 126 via a non-sharable resource connection 132 having a non-sharable resource connection 132a from send work queue 120a to receive work queue 126b and a non-sharable resource connection 132b from send work queue 126a to receive work queue 120b.

A send buffer WQE placed on one QP in a reliable connection service causes data to be written into the receive buffer of the connected QP. RDMA operations operate on the address space of the connected QP.

The reliable connection service requires a process to create a QP for each process which is to communicate with over the SAN fabric. Thus, if each of N host processor nodes contain M processes, and all M processes on each node wish to communicate with all the processes on all the other nodes, each host processor node requires $M^2 \times (N - 1)$ QPs. Moreover, a process can connect a QP to another QP on the same SANIC.

Recio page 12, lines 3-25.

In addition, the Examiner cited page 13, lines 1-5, page 14, lines 3-7, page 23, lines 29-31, Fig. 1 and 9 of the Recio reference, all disclosing the condition recited by independent claim 21 (similarly recited in claims 11 and 26), whereby if the at least one buffer is unavailable then the steps of dropping the data packet, providing a notification regarding the unavailability of the at least one buffer, and withholding an acknowledgement packet from the node that sent the data packet would ensue. However, as can be clearly seen, the above claimed method step of claim 21 or an equivalent variation thereof, such as those recited by independent claims 1, 11 and 26, is not disclosed or suggested by the Recio reference.

For at least these reasons, the Applicants respectfully submit that independent claims 1, 11, 21 and 26 (and the claims dependent thereon) are not anticipated by the Recio reference. Accordingly, the Applicants respectfully request the withdrawal of the rejection of claims 1, 2, 4, 7-10, 11, 12, 14, 17-19, 20-23, 25 and 26 under Section 102 based on the Recio reference.

The Rejections Under 35 U.S.C. § 103

With respect to the rejection of claims 3, 5, 6, 13, 15, 16 and 24 under 35 U.S.C. § 103(a) as being obvious over the Recio reference in view of the SCSI reference or the Mode reference, the Applicants contend that these rejections are defective for at least the reasons set forth above with respect to the rejection of independent claims 1, 11, 21 and 26 under Section 102. It is well-settled that the prior art must contain each and every limitation of the Applicants' claims in order for a combination of reference to render those claims obvious. In this case, neither the SCSI reference nor the Modi reference cure the above-argued deficiencies of the Recio reference because those references do not contain the elements that are not disclosed in the Recio reference. Indeed, the SCSI reference and the Modi reference are not even alleged by the Examiner to contain the limitations argued by Applicants to be missing from the Recio reference. Accordingly, the combination of the Recio reference with either the SCSI reference or the Modi reference cannot render the Applicants' independent claims obvious. For at least these reasons, the Applicants respectfully assert that the rejections of claims 3, 5, 6, 13, 15, 16 and 24 under Section 103 are erroneous and should be withdrawn.

Conclusion

In view of the remarks set forth above, the Applicants respectfully request reconsideration of the Examiner's rejections and allowance of all pending claims 1-26. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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